animal, when injected into a guinea-pig 24 hours before inoculation with several times the fatal dose, conferred immunity; 2cc. proved potent enough to save the lives of guinea-pigs when injected 48 hours after inoculation.

Sanarelli's work upon immunization was still in progress when the third memoir was written, and the outcome of his projected experiments in serum-therapy will be awaited with much interest.

EDWIN O. JORDAN.

LUDWIG RÜTIMEYER.

ON the 25th of November, 1895, died at Basle Ludwig Rütimeyer, the last survivor of a long series of Swiss naturalists, the representatives of the classic period of natural science in this country. Now, two years after the death of this distinguished naturalist, his miscellaneous papers appear in a form capable of attracting the attention of the scientific world.* Rütimeyer's numerous publications, which for a long time chiefly adorned the 'Abhandlungen der schweizerischen palæontologischen Gesellschaft' and the 'Denkschriften der schweizerischen naturforschenden Gesellschaft,' could not be reproduced, but the smaller occasional lectures and writings, which, owing to the astonishing universality of Rütimeyer's researches and studies, deal with questions of zoology and anthropology as well as of geology and geography, are here collected in two volumes. It is well known what a high position the leader of European paleontology, von Zittel, has assigned, for example, to Rütimeyer's paper on the geographical and geological distribution of animals. Whoever shall read this and the similar papers made accessible by this edition will be surprised by the perspicacity of the conclusions and the abundance of openings in every direction of natural philosophy, the exceeding originality and the immense knowledge of details which characterized the man, to whom in the last decades, along with Sir Richard Owen, Vertebrate Paleontology in Europe is most indebted. Among the fundamental questions of zoology we find treated the principles of natural history, the boundaries of animal life, the phylogeny of the vertebrate skeleton, the changes in animal life in Switzerland since the presence of man, the modality of progress in the organic world, general considerations on the sectonic structure of Europe, history of glacier studies in Switzerland, three essays on the Bretagne and addresses in the memory of L. Agassiz, Ch. Darwin, P. Merian and B. Studer, who were in intimate relations with Rütimeyer. The first volume is introduced by an autobiographical sketch, which may give to American naturalists an idea of the development, the many suggestions and difficulties of a Swiss who devoted his life to natural philosophy.

RUD. BURCKHARDT.

BASEL, December 1, 1897.

** 'Gesammelte Schriften.' Basle, Georg et Cie. 1898.*

*CURRENT NOTES ON PHYSIOGRAPHY.**

THE GLACIAL LAKE AGASSIZ.

As the Monographs by Gilbert and Russell on the extinct Lakes Bonneville and Lahontan are the classics with regard to basins from which former bodies of water have been withdrawn by evaporation, so

** In SCIENCE for December 3d it was implied that the recent report of the Maryland Geological Survey had neglected possible relations with the schools of the State and devoted its physiographic studies to the interests of 'those who may seek a home in Maryland.' This error was due to my eye having caught the heading 'Study of the Pysiographic Features of the State' (p. 40), in which only the immigrant is referred to as taking advantage of the results; while I failed to note, under the heading 'Preparation of Final Reports,' a very explicit mention of their educational significance. "It is most desirable that the youth of Maryland should grow up with a knowledge of the country in which they live, and be*

Monograph XXV. on the Glacial Lake Agassiz, by Warren Upham (U. S. Geol. Survey, Washington, 1895) at once takes its place as a standard work regarding one of those remarkable water bodies which for a time flooded an area marginal to the retreating ice sheet. A great fund of detailed description is here added to the reports already published by Upham and others, regarding the Red river plain, outlets, shore lines, deltas, etc. It is important to note that large areas of the plain at its south end and along either side are mainly composed of unstratified till, and that only the medial part of the plain is covered by lacustrine silts. The plain, therefore, should be classified not only under lacustrine plains, but also under plains of till; the latter species being until recent years unmentioned in text-books. An intricate lacustrine history is revealed by the complicated succession of shore lines which varied with gentle epirogenic movements, and by the changes of discharge from the southern outlet to some more northern lines of overflow. Maps and views are liberally provided. As has been the case with many other phases of glacial study, it is remarkable to discover how largely the existing physiographic conditions of certain regions are dominated today by processes associated with glacial action. Yet until very lately our physical geographies gave practically no attention to land forms of glacial origin. This neglect cannot long continue in face of so fine a collection of examples as this great monograph contains.

able to interpret intelligently the physical features of the State." If the people of the State desire it, material adapted for purposes of public instruction will be provided in future volumes.

Having for some years believed that our State Surveys lost a valuable opportunity of serving the public good, and of gaining sound public support by their general neglect of relations with the public schools, I am glad now to make explicit correction of my former note on the Maryland Survey in this regard.

VOLCANOES OF NORTH AMERICA.

Following the plan of his volumes on Lakes and Glaciers, Russell has completed a valuable work on the Volcanoes of America, 'a reading lesson for students of geography and geology' (Macmillan, 1897, p. 346, many plates). A third of the book is given to characteristics of volcanoes, presenting an excellent summary of the subject, excepting that 'erosion of volcanoes' is, for a geographical book, too briefly dismissed in four pages, as compared to thirty pages allotted to products of volcanic action. The descriptive chapters on the volcanoes of different districts summarize the results of our Western surveys, where Russell's own observations play no unimportant part, and abstract many accounts not generally accessible, such as those concerning the explosive eruption of Conseguina, the building of Jorullo, the recent explorations of the lofty Mexican cones, and the surveys of the Alaskan islands. The dissected cones and heavy lava beds of the Yellowstone Park are not mentioned. A chapter of theoretical considerations explains the ascent of lavas from their deep sources chiefly as an escape from the pressure of the enclosing crust, and characterizes steam explosions as relatively superficial incidents instead of prime causes of eruption. A final chapter gives the life history of a volcano. The illustrations are numerous and excellent.

LAKES IN HIGH MOUNTAINS.

E. Fugger has an article on *Hochseen* (Mitth. Geogr. Gesell. Vienna, XXXIX., 1896, 638–672), in which he gives especial attention to the small lakes occurring in the Karen (corries, cirques, amphitheatres) of the Salzburg Alps, the 'normal lakes' of high mountains. He discards the explanation by glacial erosion maintained by Böhm and many others, and Richter's modification of this explanation, where drift ob-

struction is called to the aid of simple excavation. After showing that corry lakes are true rock basins and that local deformation cannot account for them, Fugger advances the idea that they lie in funnel-shaped cavities that once led down to subterranean channels opened by solution, but now obstructed; even advocating this explanation in corries of crystalline rocks, and defending it by a rather elaborate physico-chemical argument.

Apart from the general difficulty of believing in the sufficiency of underground solution in resistant rocks, it seems impossible that erosion thus determined could exceed that effected by the active streams that descend the steep slope on the open sides of corries. As the problem is presented by the writers mentioned above and by various others, glacial erosion seems to be the most competent cause for corry lakes.

THE 14000 MALDIVE ISLANDS.

THE rarely visited Maldive archipelago is described in an interesting article by Rosset (Mitth. Geogr. Gesell. Vienna, XXXIX., 1896, 597–637). The islands are all of coral formation, seldom more than two meters above sea level, with much unhealthy swampy surface. They are seldom more than a few miles in diameter. More than a hundred islets may form the circumference of a single atoll, and sometimes the individual islets themselves have a ring-like, atoll form. The seaward submarine slopes are steep; the shores are attacked by heavy surf, and the natives believe that the land area is decreasing. The islands are separated by deep passages through which strong currents run one way or the other according to the monsoon season. Many channels breach the reefs and give access to quiet anchorages in the lagoons. The colors about an atoll vary from the purple waters off shore to the green, shallow water, the white coral strand, the olive brown reef with dark green vegetation, and the bright green lagoon. A description of the people and their history follows.

W. M. DAVIS.

HARVARD UNIVERSITY.

CURRENT NOTES ON ANTHROPOLOGY.

ELEMENTS OF MELANESIAN ART.

AN article of prime value to students of early art and to anthropologists in general is that by Dr. K. Th. Preuss, in the *Zeitschrift für Ethnologie*, 1897, Heft III. and IV., on the artistic designs of the natives of Kaiser Wilhelms Land, New Guinea. The material he had at his command was a collection of over five thousand specimens now in the Museum of Ethnography, Berlin. He considers it practically complete, presenting the world of their art in line and figure. His article is illustrated with 199 figures in the text, yielding ample means for studying the leading motives of these savage artists. The analysis of their favorite forms is traced out with masterly precision, and as one follows the author in his unraveling the strange and intricate figures he copies, no doubt is left of the success of his undertaking.

In some introductory pages he refers to the bearing of such studies on the question of transmission or independent origin, and on the tendency of primitive man to copy from nature and to conventionalize his copies. Several popular impressions are corrected and sounder methods of comparison explained.

THE EXTENSION OF THE ARAWACK STOCK.

THIS stock of South American languages has peculiar interest, as it is that which spread over the West Indian Archipelago and the Bahamas at some remote date; and if any of the native languages of our Gulf States had South American affinities, they should be looked for in the Arawack and not